ABSTRACT

This invention pertains to a method for generating a pool of nucleic acid fragments useful for *in vitro* recombination and the creation of novel DNA sequences that encode desirable proteins or enzymes. The invention provides a defined mixture of nucleic acids and methods for use in the synthesis, mutagenesis, and recombination of nucleic acids. Nucleic acids may be synthesized by creating a nucleic acid extension ladder, annealing the extension ladder to template nucleic acids, and further extending the ladder of nucleic acids. The invention also relates to methods for performing repeated cycles of synthesis for the purpose of mutagenesis or recombination, methods for producing mutant peptides and proteins from the mutagenized or recombined nucleic acids, and methods for selecting a peptide, polypeptide or protein having altered biological activities.

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